succincti—*Anthocharis cardamines*—with the following results:—In seven instances I cut the loop (and sometimes a second one) which the caterpillar had spun; and in all the chrysalis was excluded without falling down; but in no case was the tail of the chrysalis withdrawn from the pocket of the old caterpillar-skin, so that its suspension is directly from the latter. In eleven cases in which I did not interfere, only two chrysalids were excluded in the normal way, *i.e.*, vertically, with the head up, a girdle round the insect and the chrysalis-tail withdrawn from the old skin and attached immediately to the silk on the stem of the plant. In three other cases in which a loop was spun by the caterpillar, the chrysalis seems to have turned upside-down during exclusion, the tail being now uppermost, the *loop twisted*, and the hooks fastened in loose silk upon the plant-stem. Six caterpillars either spun no loop at all or one so insufficient that they became *suspensi* of themselves before exclusion began, and were all but one (which fell down) successfully excluded in this position—the tail of the chrysalis, however, being still retained within the pocket of the old skin.

The most interesting and curious point in the transformation of a caterpillar of the *suspensi* is the manner in which the newly-excluded chrysalis is kept from falling, while its hook-furnished tail is being withdrawn from the old skin of the caterpillar and made fast in the cone of silk to which the latter was attached. I am ignorant whether any other explanation of this process has been given than that, I believe, originally communicated by Réaumur and detailed in Kirby and Spence, vol. iii. pp. 208–209, and repeated in such recent works as Figuier's "Insect World," from the English edition of which work by Prof. P. Martin Duncan (1872), p. 148, I quote the following account of the pupation of *Vanessa urticæ*:—"But here comes the culminating point, the most difficult part of the operation. The chrysalis, which is shorter than the caterpillar, is at some distance from the silky network to which it must fix itself; it is only supported by that extremity of the caterpillar's skin which had not been split open. It has neither legs nor arms, and yet it must free itself from this remaining part of the skin, and reach the threads to which it is to suspend itself. *The supple and contractile segments of the chrysalis serve for the limbs which are wanting to it. Between two of these segments, as with a pair of pincers, the insect seizes a portion of the folded skin, and with such a firm hold that it is able to support the whole of its body on it.* It now curves the hinder parts slightly, and draws its tail entirely out of the sheath in which it was inclosed," &c. (The italics are mine.) How this can be conceived possible, considering the utterly soft condition of the newly-excluded pupa, and that the caterpillar skin is now "reduced to a packet so small that it covers only the end of the tail of the chrysalis" (*loc. cit.*), in which, moreover, there are no longer any free segments, I cannot understand. On the other hand, it is very easy to show that the last and sufficient bond of connection between the chrysalis and the old larva-skin is *a membrane extending from the lining of the latter to the anterior horns of the two lateral ridges bounding the anal area of the chrysalis.* I have prepared several specimens showing this membrane still intact, and should be happy to forward one or two, if required, for inspection. I find it in all three species of butterfly mentioned above, and I believe it is to the persistence of it unbroken that is owing the continued suspension of my chrysalides of Anthocharis. I have tested its strength to sustain the weight of the chrysalis, and the time during which it resists desiccation and the writhings of the insect, the obvious object of which is, not to get rid of the old caterpillar-skin, but to rupture this membrane after the chrysalis has made good its tail-attachment to the silk. J. A. OSBORNE

Milford, Letterkenny

The Satellites of Mars

IT is not necessary to have an enormous telescope in order to see the outer satellite of Mars. I had a very satisfactory view of it on September 15 at 9h. 20m. with a nine-inch reflector, and only lost it in the planet's glare at about 10h. 50m. I would have written to you on the subject earlier, but was not aware that it was considered so extremely difficult an object until I read the letters in your paper of the 27th ult. JOHN BRETT

The Lizard, Cornwall, October 6

Rate of Mound-Building

THE papers announce that Mr. Layard has obtained permission to renew excavations in the Mesopotamian Valley. Several other explorations will be in progress during the coming season in countries where no trained labour can be obtained. I write to beg the gentlemen having the work in charge to make some accurate observations as to the amount of dirt which a man can move in a day with rude implements, noting the distance as well. A discussion has sprung up concerning the time required to build our Mississippi Valley mounds. The investigation of which I speak will throw some light on the subject.

Washington, D.C., September 26 OTIS T. MASON

OUR ASTRONOMICAL COLUMN

THE MELBOURNE OBSERVATORY.—The twelfth Report of the Board of Visitors of this Observatory, addressed to the Governor of Victoria, with the Annual Report of the Government Astronomer, is before us. It presents an outline of the work accomplished between June 20, 1876, and May 22, 1877, and of the work in progress and in prospective. With the great reflector, which is in charge of Mr. Turner, the observation and drawing of Sir John Herschel's figured nebulæ has been continued. A finished drawing of the Horse-shoe Nebula, M. 17, has been made, together with drawings of fifty-seven of the smaller nebulæ. The publication of this work is in progress; out of ninety-three drawings which it is intended to publish, sixty-one are already lithographed; they are representations of the nebulæ on a black ground, and Mr. Ellery states that they render the telescopic appearance of the objects in a most effective and truthful style, and if the lithographic printers succeed in obtaining the requisite number of copies as perfect as the proof copies which were submitted to the Board of Visitors, he considers that "the whole difficulty of economically and satisfactorily reproducing these astronomical drawings will be surmounted." The descriptive letter-press will be ready by the time the lithography is finished, and it is expected that before the next annual inspection of the Observatory this first instalment of results furnished by the great telescope will have been distributed over the colonies and throughout Europe and America. With the "South equatorial" Mr. Ellery has been engaged upon a work of no small interest and astronomical value, viz., the re-measurement of the double-stars contained in Sir John Herschel's Cape Catalogue, 1834–38, in which revision he is promised the co-operation of Mr. Todd with the Adelaide refractor. Mr. Ellery further mentions that he hoped to utilise the present opposition of Mars, in connection with northern observatories, for a determination of the solar parallax. The transit-circle observations, which are regarded as the main work of the establishment, are zealously continued. The magnetic and meteorological work is upon the same general plan as hitherto, but the former was likely, at the date of the Report, to suffer some interruption from the necessity of erecting a new magnetic-house.

THE OUTER SATELLITE OF MARS.—Though this object will no doubt be growing fainter with the increasing distance of the planet from the earth, a few positions are subjoined which have been deduced from elements fairly representing measures made by Mr. Common, at Ealing, to the end of September. The two or three days when the moon will be near to Mars are omitted:—

At 8h. 30m. Greenwich Mean Time.

Oct. 11 ...	Pos.	69° ...	Dist.	66″	Oct. 20 ..	Pos.	42° ... Dist. 37″
,, 12 ...	,,	107 ...	,,	38	,, 21 ...	,,	80 .. ,, 58
,, 13 ...	,,	235 ...	,,	51	,, 22 ...	,,	168 ... ,, 22
,, 14 ...	,,	266 ...	,,	57	,, 23 ..	,,	248 ... ,, 58
,, 15 ...	,,	23 ...	,,	29	,, 24 ...	,,	288 ... ,, 34
,, 16 ...	,,	74 ...	,,	64	,, 25 ...	,,	53 ... ,, 45

At the times mentioned in Lord Rosse's letter (NATURE, vol. xvi. p. 457) the calculated places of the satellite were as follows:—September 8, at 11h. 45m., pos. 70°, dist. 85″, and September 15, at 11h. 30m., pos. 246°, dist. 79″.

The period of revolution given by measures between

August 11 and September 30 appears to be 1d. 6h. 18m. 12s.

THE NEAR APPROACH OF SATURN AND MARS, NOVEMBER 3.—At the times of meridian transit at Greenwich the position of Saturn with reference to Mars near the conjunction of those bodies at the beginning of the ensuing month will be—

November	2	...	Angle	80	...	Distance	24·5
,,	3	...	,,	138	...	,,	9·4
,,	4	...	,,	212	...	,,	22·0

It will be seen that on November 3, about 8 P.M., the distance is about equal to the greatest elongation of the Saturnian satellite Japetus, but the satellite is not on this occasion in a position to be occulted by Mars.

NEW COMET.—A telescopic comet was discovered on the evening of October 2, at Florence, by M. Tempel, to whom we already owed the discovery of the remarkable comet of January, 1866, which is found to be associated with the November meteor-stream, and the comets of short period of 1867 and 1873. Its position at 9h. is stated to have been in R.A. 23h. 51m., N.P.D. 100° 19′. It was observed by Prof. Winnecke at Strasburg on the 6th, and is described by him as pretty bright, about 0′·4 in diameter with a star-like nucleus 10·11m., and a faint tail 4′ in length on an angle of 25°. The diurnal motion appears to be about 3·5 minutes in R.A. diminishing, and in N.P.D. about 64′ increasing.

It may be noted that the position of this comet on October 2 was not far from that which would be occupied by the short-period comet of De Vico, due about this time, if it had arrived at perihelion at the end of the first week in September, but the observed direction of motion of the new comet is contrary to that which De Vico's must have under such condition, so that there can be no suspicion of identity. Prof. Winnecke's observations on October 6 give for the comet's apparent place at 11h. 15m. 5s. mean time at Strasburg, right ascension 23h. 36m. 21·59s., south declination 14° 36′ 33″·0.

BIOLOGICAL NOTES

THE GOMBI ARROW POISON.—In a recent number of the *Bulletin Mensuel de la Société d'Acclimatation* of Paris, M. M. E. Hardy gives a detailed account of researches and experiments on the active principle of the poison obtained from the seeds of *Strophanthus hispidus*. This plant, which belongs to the poisonous order Apocynaceæ, was first observed by Houdetot, a French naturalist in Senegambia, afterwards by Smeathmann near Sierra Leone, by Baikie at Nupé, by Griffon du Bellay at Gaboon, and by Gustav Mann in Western Tropical Africa. It is a climber with a hollow cylindrical stem, and grows in the forests, where it ascends to the summits of the highest trees. The oblong, nearly sessile, opposite leaves are from ten to twelve centimetres long by five wide, and are covered with hairs, particularly on the under surface. The yellow flowers are borne on terminal cymes. The fruit is a cylindrical follicle somewhat thicker that the thumb, and contains from 100 to 200 oval seeds. By means of a fruit given them by the Paris Society, MM. Hardy and Gallois have discovered that the active principle is not, as was supposed, an alkaloid, and for it the name *Strophantine*, given to it some years ago by Dr. Fraser, is retained. Besides, they succeeded in isolating a substance presenting the characters of an alkaloid, but which did not seem to possess any marked physiological properties; for this they propose the name *Inéine*. The former is very poisonous, a single crystal placed under the skin of a frog's foot causing the cessation of the heart's action in a few moments. Even after this has taken place the animal still possesses the power of motion, and it is only after respiration has become impossible, owing to the interruption of circulation in the nervous centres, that death ensues from paralysis of the heart. These observations, though yet incomplete, accord pretty well with facts recorded by different authors, and seem to prove that *Strophantine* is really the poisonous agent in *Strophanthus hispidus*. The most elaborate experiments on the poison found at the extremity of the arrows (used by the natives both in war and in hunting) are those conducted by MM. Carville and Polaillon in the laboratory of M. Vulpian. They were made on various classes of animals and show that the deadly action is much more rapid in mammals and birds than in molluscs, crustaceans, and fishes. On frogs under the influence of curare the poison acts much more slowly, though the respective actions of the two substances do not neutralise each other.

THE GELADA.—Several living specimens of this extremely rare Abyssinian monkey, first described by Dr. Ruppell in 1835, have quite recently reached this country for the first time, and are being exhibited at the Alexandra Park. The exact affinities of the species have never been fully determined, different biologists placing it, some with the Macaques, others with the Baboons. It is peculiar in that the male is covered with very lengthy air, like that of the Wanderoo, whilst the female is a much more ordinary-looking monkey. In the male, also, there is a bare spot in shape like an inverted T, upon the breast, which is of a bright-pink colour, becoming red and expanded into an inverted heart-shaped patch upon excitement. The tail is long and like that of a lion, having a bushy tuft at the extremity. The colour is a sooty dark-grey brown, verging upon black; the hands and feet are black; the nails are powerful and long. The size of the male is about that of a Chimpanzee four years old. The eyes are close together, and the snout prolonged. The living animal has a habit of everting the whole upper lip when irritated, and thus exposing its formidable array of teeth.

AMERICAN INSECTIVORA.—Precursory notes on American insectivorous mammals, with description of new species, by Dr. Elliott Coues, have reached us. A new sub-genus of *Blarina* is named *Loriciscus*. *Sorex sphagnicola* and *S. evotis* are new species determined by the author, whilst descriptions of *S. pacificus*, *S.* (*Notiosorex*) *crawfordi*, and *Blarina mexicana* are given from manuscripts of Prof. Baird.

COAGULATION OF BLOOD.—We notice an interesting paper by M. Fredericq, "On the Coagulation of the Blood," in the seventh number of the *Bulletin* of the Belgian Academy. The paper deals especially with fibrinogen and its transformation into fibrine. The author having discovered that fibrinogen coagulates at 56° C., *i.e.*, at a temperature far lower than the temperature of coagulation of other albuminoids of the blood, this property of fibrinogen enabled him to study the transformation of that body into fibrine, and to throw some new light on the obscure problem of coagulation of blood. The researches are to be continued.

PERSIAN AND SARDINIAN OPILIONES.—A memoir by Dr. Thorell, professor of Zoology at Upsala, has been published at Genoa containing descriptions of certain species of *Opiliones* from Persia and Sardinia preserved in the museum at Genoa, together with diagnoses of additional forms in the collection of the author, which are interesting, either as being new to science, or as having hitherto been imperfectly known. In order to advance the study of the *Phalangidea* Dr. Thorell has incorporated in this treatise a revision of the European genera, thus rendering it invaluable to every arachnologist who is desirous of studying the group.

THE DAPHNIADÆ.—In the *Berichte der Verhandlungen* of the Freiburg Society of Naturalists Prof. Dr. August